THE CLAIMS

What is claimed is:

1. A method for processing an OFDM signal received over a wireless communication channel, said OFDM signal comprising a packet of a number N of OFDM blocks, each OFDM block comprising a number K of signal tones, the method comprising the steps of:

sequentially receiving N channel-impaired OFDM blocks;

computing noisy channel estimates, based on said channel-impaired blocks;

arranging the noisy channel estimates into a first array having a first axis representative of a frequency index of the noisy channel estimates and a second axis representative of a time index of the noisy channel estimates;

performing a first two-dimensional Fourier transform on said first array;

multiplying the Fourier transformed first array with a second array representing a two-dimensional filter to thereby form a third array; and

performing a second two-dimensional Fourier transform on said third array to thereby form a fourth array comprising elements representative of an estimate of channel parameters for said wireless communication channel.

2. The method of claim 1, wherein the two-dimensional filter is a diamond shaped filter.

3. The method of claim 1, wherein said step of computing the noisy channel estimates is performed by multiplying the elements of each channel-impaired OFDM block with corresponding reference pilot symbol values known to have been inserted into that block upon transmission.

4. The method of claim 1, wherein said step of computing the noisy channel estimates is performed by multiplying the elements of each channel-impaired OFDM block with corresponding estimates of a demodulated signal.

5. The method of claim 1, wherein said step of computing the noisy channel estimates is performed by multiplying the elements of each channel-impaired OFDM block with corresponding estimates of a decoded signal.

6. The method of claim 1, wherein said step of sequentially receiving the N blocks is performed at the receiver by a plurality of antennas, each of said antennas sensing N channel-impaired blocks.

7. A method of estimating channel parameters for a wireless communication channel by transmitting a signal from a transmitter to a receiver, the method comprising the steps of:

inserting pilot symbols at predetermined positions in a plurality of blocks, each block comprising a plurality of data symbols representative of a signal being transmitted;

sequentially transmitting each of said plurality of blocks over a finite number of tones, said finite number of tones being broadcast substantially simultaneously for each block;

sequentially receiving a corresponding plurality of channel-impaired blocks at the receiver;

computing a corresponding plurality of noisy channel estimates from said plurality of channel-impaired blocks;

arranging the plurality of noisy channel estimates into a first array having a first axis representative of a frequency index of the noisy channel estimates and a second axis representative of a time index of the noisy channel estimates;

performing a first two-dimensional Fourier transform on said first array;

multiplying the Fourier transformed first array with a second array representing a two-dimensional filter to thereby form a third array; and

performing a second two-dimensional Fourier transform on said third array to thereby form a fourth array comprising elements representative of the channel parameters.

8. The method of claim 7, wherein the two-dimensional filter is a diamond shaped filter.

9. The method of claim 7, wherein said step of computing the noisy channel estimates is performed by multiplying elements of the channel-impaired blocks with corresponding reference pilot symbol values known to have been inserted into the blocks at the transmitter.

10. The method of claim 7, wherein said step of computing the noisy channel estimates is performed by multiplying elements of the channel-impaired blocks with corresponding estimates of a demodulated signal.

11. The method of claim 7, wherein said step of computing the noisy channel estimates is performed by multiplying elements of the channel-impaired blocks with corresponding estimates of a decoded signal.

12. The method of claim 7, wherein said step of sequentially receiving the blocks is performed at the receiver by a plurality of antennas, each of said antennas sensing channel-impaired blocks.

13. The method of claim 7, wherein the pilot symbols are inserted into a sequence of blocks such that, upon arranging said blocks into a 2-D array having a first axis representing a frequency index and a second axis representing a time index for transmission of a corresponding block, the pilot symbols form a non-rectangular grid.

14. An apparatus for processing an OFDM signal received over a wireless communication channel, said OFDM signal comprising a packet of a number N of OFDM blocks, each OFDM block comprising a number K of signal tones, said apparatus comprising:

at least one antenna arranged to sequentially receive N channel-impaired OFDM blocks;

a first multiplier configured to compute K noisy channel estimates for each of said N channel-impaired blocks, based on said channel-impaired blocks;

a first two-dimensional transformer arranged to perform a first two-dimensional transform on the K noisy channel estimates for each of the N blocks, wherein said noisy channel estimates are arranged into a first array having a first axis representative of a frequency index of the noisy channel estimates and a second axis representative of a time index of the noisy channel estimates;

a second multiplier configured to multiply the two-dimensional transformed first array with a second array representing a two-dimensional filter to thereby form a third array; and

a second two-dimensional transformer arranged to perform a second two-dimensional transform on said third array to thereby form a fourth array comprising elements representative of an estimate of channel parameters for said wireless communication channel.

15. The apparatus of claim 14, wherein said two-dimensional filter is a diamond-shaped filter.

16. The apparatus of claim 14, further comprising a switch configured to selectively provide one of two data values to said first multiplier.

17. The apparatus of claim 14 comprising a plurality of antennas, each antenna arranged to sequentially receive N channel-impaired OFDM blocks.

18. A diversity receiver for receiving an OFDM signal over a wireless communication channel, said OFDM signal comprising a packet of a number N of OFDM blocks, each OFDM block comprising a number K of signal tones, said receiver comprising:

a plurality of antennas, each antenna configured to sequentially receive N channel-impaired OFDM blocks which have been transmitted over said wireless communication channel;

a channel estimator configured to estimate channel parameters for the wireless communication channel based on the N channel-impaired OFDM blocks received by each antenna, said channel estimator comprising:

a first two-dimensional transformer arranged to perform a first two-dimensional transform on a two-dimensional array of noisy channel estimates;

a second multiplier configured to multiply the two-dimensional transformed first array with a second array representing a two-dimensional filter to thereby form a third array; and

a second two-dimensional transformer arranged to perform a second two-dimensional transform on said third array to thereby form a fourth array comprising elements representative of an estimate of channel parameters for said wireless communication channel; and

a diversity combiner arranged to estimate a transmitted signal based on said elements representative of an estimate of channel parameters produced by said channel estimator and said N channel-impaired OFDM blocks received at each antenna.

19. The apparatus of claim 18, wherein said two-dimensional filter is a diamond-shaped filter.

20. The apparatus of claim 18, further comprising a switch configured to selectively provide one of two data values to said first multiplier.